DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 1.28

WELDING INSPECTION REPORT

Resident Engineer: Pursell, Gary
Address: 333 Burma Road
City: Oakland, CA 94607

Report No: WIR-012925
Date Inspected: 31-Mar-2010

Project Name: SAS Superstructure
Prime Contractor: American Bridge/Fluor Enterprises, a JV
Contractor: American Bridge/Fluor Enterprises, a JV

OSM Arrival Time: 700
OSM Departure Time: 1530
Location: Job Site

CWI Name: See Below

Inspected CWI report:	☐ Yes	☑ No	☐ N/A	**CWI Present:**	☑ Yes	☐ No	
Electrode to specification:	☑ Yes	☐ No	☐ N/A	**Rod Oven in Use:**	☑ Yes	☐ No	☐ N/A
Qualified Welders:	☑ Yes	☐ No	☐ N/A	**Weld Procedures Followed:**	☑ Yes	☐ No	☐ N/A
Approved Drawings:	☑ Yes	☐ No	☐ N/A	**Verified Joint Fit-up:**	☑ Yes	☐ No	☐ N/A
				Approved WPS:	☑ Yes	☐ No	☐ N/A
				Delayed / Cancelled:	☐ Yes	☑ No	☐ N/A

Bridge No: 34-0006
Component: Orthotropic Box Girders (OBG)

Summary of Items Observed:

Erection Site

Quality Assurance inspector (QA) Michael Foerder was at the American Bridge/Flour (ABF) job site at Yerba Buena Island in California between the times noted above in order to monitor Quality Control functions and the in process work being performed by ABF personnel. The following items were observed:

1. OBG Field Splice 1E/2E D Face (Inside) in process MT.
2. OBG Field Splice 2E/3E D-1 FCAW in process
3. OBG Field Splice 2E/3E C-1 FCAW in process
4. OBG Field Splice 3E/4E D Face SAW in process
5. OBG Field Splice 3E/4E A-3 and A-5 SMAW UT Repairs

Field Splice 1E/2E Face D (Inside)

The QA inspector noted and periodically observed QC inspector Jessie Cayabayab performing Magnetic Particle Testing (MT) for the inside face of field weld D. The QC inspector was noted to be performing minor cleaning and scraping in preparation of the exam and had marked several areas for minor indication which will require grinding/blending. The QC inspector progressed across the transverse seam with no significant linear indications discovered; however several isolated areas were marked for weld build up due to insufficient fill and undercut being present. The QC inspector marked the areas which were acceptable and relayed to the QA inspector the outside was completed the previous day and ultrasonic testing is to follow.

Field Splice 2E/3E Face C-1

The QA inspector periodically observed the in process Flux Cored Arc Welding (FCAW-G) being performed by ABF welding personnel Mitch Sittinger and Song Tao Huang between Y locations designated 2700mm – 5200mm. QC inspector Bernard Docena was noted to be present in order to monitor the progress and ensure the welding was within the established Welding Procedure Specification (WPS) noted as ABF-WPS-D1.5-3042A-1. The preheat and interpass temperature was verified by the QC and QA inspector to be greater than 93° Celsius (C) and the parameters were verified to be 255 amps, 24.5 volts and a measured travel speed of 270mm/min. The welder is in the process of placing the fill passes at this time. The work progressed throughout the morning shift and just prior to the lunch break the welder was noted to be placing the final cover passes in this area and relayed to the QA inspector he would be relocating further up the side plate to approximately Y location 2700mm – 800mm. The work appeared to be progressing in general conformance with the contract documents.

Field Splice 2E/3E Face D-1 (South Half of Weld Joint)
The QA inspector periodically observed the in process Flux Cored Arc Welding (FCAW-G) being performed in the 4G overhead position by ABF welding personnel Rory Hogan and Jeremy Dolan for the South half of the weld joint. QC inspector Jim Cunningham was noted to be present in order to monitor the progress and ensure the welding was within the established Welding Procedure Specification (WPS) noted as ABF-WPS-D1.5-3040A-4. The preheat and interpass temperature was verified by the QC and QA inspector to be greater than 65° Celsius (C) and the parameters were verified to be 233 amps, 23.4 volts and a measured travel speed of 153mm/min. The welder is in the process of placing the fill passes at this time. The work progressed throughout the QA inspector's shift, was not completed and appeared to be progressing in general compliance with the contract documents.

Field Splice 3E/4E Face A (UT Repairs)
The QA inspector periodically observed ABF welding personnel James Zhen removing the rejectable indications (2) discovered previously by Ultrasonic Testing (UT). The welder removed and prepared the excavation areas by grinding and after the QC inspector performed a visual examination, the welder proceeded to perform Shielded Metal Arc Welding (SMAW) utilizing E7018 H4R electrodes in accordance with the WPS noted as ABF-WPS-D1.5-D1000-Repair Rev 2. The average amperage was verified to be 120 DC with the welder being observed performing proper cleaning between passes. The welder completed the area at weld location designated A-5 and progressed to A-3. A digital photo is included in the body of this report for general information. The work was completed on this date by 0930 and 1035 respectively and this information was placed directly on the steel by the QC inspector in order to verify the hold time prior to re-examination by UT. The work appeared to be in general conformance with the contract documents.

Field Splice 3E/4E Face D (Inside) In Process SAW
The QA inspector observed ABF welding operator and Foreman Dan Iraci perform the initial root pass of the inside face of OBG field splice 3E/4E Face D utilizing the Submerged Arc Welding (SAW) process. QA inspector Mike Johnson and QA inspector Rick Bettencourt relayed the weld joint fit up was acceptable and was reviewed previously. During the initial weld pass QC inspector Bernard Docena was observed verifying the welding parameters and pre heat requirements in accordance with the established WPS designated as ABF-WPS-D15-4042B-1 and noted them to be 560 amps, 30.5 volts and a measured travel speed of 390mm/min.

At the completion of the weld pass the QC inspector returned to a different location and QC inspector Mike Johnson took over the observation of this location. During a review of the initial weld pass it was discovered that areas existed in which the weld pass fused both sides of the bevel faces and a significant amount of slag was

trapped at the edges of the weld metal/base metal interface. The root opening varied between 14-20mm and it was unclear if the welder had attempted to split the layers of the root pass and this information was relayed to the QC inspector. The welder had a helper remove one or two areas of the slag entrapment and then proceeded to place an additional weld pass without removing a significant amount of the areas which tied both sides of the bevel together and the trapped slag deposits. Due to the QC inspector not being in the area the QA inspector inquired of the welder about removing the slag and splitting the layers of the root due to the gap being greater than 12mm and the welder responded with " I am going to remove the backing bar and backgouge". At this time the welder continued with the subsequent weld pass and the QA inspector went to locate the QC inspector and relay this information to him. This information was relayed to Mr. Johnson a few minutes later on the top deck of the OBG. No welding was performed after the completion of the subsequent pass at this location for a brief period of time and it was relayed to the QA inspector there was some question by the welder of possible contamination of the welding consumable due to oil and several areas of porosity discovered in a portion of the weld pass. A portion of the weld pass was ground to remove the porosity and then the welder proceeded to place an additional weld pass.

The QA inspector relayed this situation to QA lead inspector Bill Levell and QCM Jim Bowers via phone. Mr. Bowers relayed he would investigate the situation and inform the QA inspector of the proposed resolution of the non conforming issue. The QA inspector periodically observed a crew of three ABF welding personnel performing grinding operations at this location. At approximately 1230 Mr. Bowers relayed to the QA inspector upon further review of the area the weld layers would be removed by grinding in order to remove the trapped slag and other items with QC inspector Tom Pascaulone working alongside the welders and then welding would resume. No further welding was performed at this location for the remainder of the shift.

Summary of Conversations:

As the QA inspector was coming down the elevator from the job site ABF welding superintendent Tom Gibson inquired from the QA inspector how the work was progressing and the QA inspector relayed overall things were progressing well with only weld face D experiencing some issues. Mr. Gibson inquired what the potential issues were and the QA inspector relayed the weld joint was effectively joined on both sides with SAW with slag and incomplete fusion at the sides being welded over without complete removal and the possibility of the consumable being exposed to oil.

Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Mohammad Fatemi (916)813-3677, who represents the Office of Structural Materials for your project.

Inspected By:	Foerder,Mike	Quality Assurance Inspector
Reviewed By:	Levell,Bill	QA Reviewer